

| *Questions put to homemakers in Rochester and Syracuse, N. Y., evoke a striking relation between knowing and doing.*

# Nutritional Knowledge and Practices

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WHY are some people less well fed than they might be, even when their income is sufficient? A study in New York State demonstrated that in a number of families where there were dietary inadequacies lack of income was not the primary cause (1). May one explanation be that homemakers do not know what to feed their families to provide a nutritionally adequate diet? Studies in Richmond, Va., in 1947 indicated that adequacy of family feeding might be related to the level of homemakers' knowledge about food and nutrition (2).

Public health workers, teachers, extension workers, and school lunch managers are interested in determining what knowledge about food and nutrition the homemaker applies to feeding her family. On what nutrition subjects have we succeeded in educating the homemaker? Where do we need to do better? What problems do homemakers have in planning, buying, or preparing food for their families? Do they seek help with these problems? What kinds of help? Where has the homemaker obtained her present information on food and nutrition?

In an attempt to answer some of these questions, we studied the food and nutrition knowl-

edge and practices of cross-sectional representative samples of homemakers in two upstate New York cities, Rochester and Syracuse, in the early fall of 1953.

## Survey Techniques

Data were collected by trained interviewers directly from homemakers, that is, persons responsible for planning family meals. The interview used pretested open-end questions. The interviewer recorded responses as nearly as possible in the homemaker's words. Ninety-six questions were asked. An average interview lasted 1 hour.

Sampling was directed by P. J. McCarthy, director of the Cornell University Statistics Center, Ithaca, N. Y. Within the city limits of Rochester, population 332,488, and Syracuse, population 220,583 (1950), sample blocks were drawn with probability proportionate to size, based on the census of housing block statistics for 1950. All private dwelling units in the sample blocks were listed, and those to be interviewed were selected by a field supervisor in a central office in accordance with a scheduled sample interval starting with a random number. Validation of the samples by comparison with statistics from the 1950 census is reported in detail elsewhere (3). The educational attainment level of the homemakers in the Syracuse sample was somewhat higher than that of Syracuse women reported in the 1950 census. No single-person dwellings were used.

Completed interviews in Rochester numbered

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**Table 1. Percentages of homemakers who named and understood why given foods should be served with each meal, and percentages using such groups in the previous 24 hours**

Basic food groups	Naming as necessary meal components		Giving reason for inclusion		Using in past 24 hours	
	Rochester	Syracuse	Rochester	Syracuse	Rochester	Syracuse
Meat, fish, poultry, etc.....	97	96	36	50	99	99
Potato, other vegetables and fruits.....	96	95	34	46	92	93
Milk, cheese, ice cream.....	68	58	31	32	82	87
Bread, flour, cereals.....	55	52	16	19	99	99
Leafy, green, or yellow vegetables.....	13	17	7	10	65	60
Butter or fortified margarine.....	12	13	4	4	78	74
Citrus fruit, tomato, cabbage.....	9	9	3	6	72	71

331 and in Syracuse, 315, representing in each city 63 percent of the sample drawn. The disposition of the rest of the sample drawn included 12-percent refusals in Syracuse and 14 percent in Rochester. The most frequent reasons given for refusals were "not interested," or "too busy," but they also included serious illnesses or recent deaths in the families, inability to speak English, apparent mental incompetency, and refusal to answer the door. The remaining 25 and 23 percent of the sample drawn were accounted for almost equally by single person dwellings and by families not at home on at least three interview attempts at different times of the day and evening.

Responses to various parts of the questionnaire were tabulated and related to the following factors: age group of the homemaker, her level of formal educational attainment, whether or not she had ever "studied about what to eat," and family income level. The age groups used included the following: young (under 40 years of age), middle-aged (40 to 60), and older (over 60). Homemakers were grouped in three levels of educational attainment—those who had not attended high school, those who had attended but not completed high school, and high school graduates. Divisions used for family income level were under \$3,500, \$3,500–\$4,999, and \$5,000 or over.

The homemaker's knowledge was assessed according to her response to a number of questions. Among others these included:

1. What do you feel should be included in the meals for your family each day? Why do you feel (name of food) should be included? Why does your family need that?

2. Maybe you have heard or read about a so-called balanced diet. What does a balanced diet mean to you?

3. Do you know what is meant by the "basic seven"? What are the groups in the "basic seven"?

4. What other foods could be used in place of milk? When you do not wish to serve meat, fish, or poultry, what foods do you think you can serve in their place and get some of the same food value? When you do not have oranges or grapefruit is there anything you can serve that would give you about the same food values? What?

### Nutritional Knowledge

Response to the question of what should be included in the family's meals each day is shown in table 1. If a homemaker named an important nutrient contribution or nutritional function served by the food group mentioned, the interviewer credited her with giving a correct reason. For example, in answer to questions about why meat and milk should be served each day, typical correct replies might include:

Meat—"because it has lots of iron" or "because it builds good red blood" or "protein" or "because it builds muscle."

Milk—"for strong bones and teeth" or "because it has lots of calcium."

In contrast, replies such as "good for you," "to grow," "because we like it," or "need it" were not interpreted as indicating specific nutritional knowledge. Those who could give a correct reason for three or more groups were said to have "adequate knowledge"; those who

could not do so for any group, "no knowledge"; and those in between, "some knowledge."

The conventional foods, such as meat or meat substitutes and potatoes and other vegetables and fruits, were mentioned for inclusion in meals by almost all of the homemakers. Only a few in the study mentioned items more likely based on nutritional knowledge than custom.

None of the homemakers mentioned all 7 of the basic food groups; only 3 percent named 6 of them; an additional 12 to 14 percent, 5. The great majority mentioned only 3 or 4 groups.

Only one-third to one-half of all the homemakers had enough knowledge to give correct reasons for inclusion of any of the food groups. Again meat or meat substitutes, potatoes and other vegetables and fruits, and the milk group were best known. Only 3 to 6 percent of the homemakers knew a reason for including vitamin C-rich fruits; 7 to 10 percent, carotene-rich fruits and vegetables; 4 percent, butter or fortified margarine; 16 to 19 percent, bread, flour, or cereals.

Assessment of nutritional knowledge was based on the number of food groups for which each homemaker could give a correct reason for inclusion in her family's meals. Nineteen percent of the Rochester and 30 percent of the Syracuse homemakers gave evidence of an adequate knowledge as defined in this study; 32 and 36 percent, some knowledge; 34 and 49 percent, no knowledge.

Approximately one-fourth of the homemakers in both cities defined a balanced diet in such a way as to show the expression was meaningful to them. Two-thirds to three-fourths of the homemakers said they had never heard of the basic seven. Only 10 to 20 percent who had heard of the term could name at least one of these food groups.

The percentage of homemakers in each city who could name possible nutritional substitutes for each of three basic foods is shown in table 2. Again, the meat group was best known.

The younger and better educated homemakers definitely displayed more knowledge of nutrition than the older and less well educated. Since age and educational level proved to be closely associated, it was felt that educational

level was the determining factor. There was no consistent relationship between family income level and the homemaker's knowledge of nutrition. What income influence appeared to be present was found to be due largely to educational differences. This finding occurred when the income and educational influences were segregated by two-way tabulation for any given measure of nutritional knowledge. Details of these relationships and supporting data are reported elsewhere (4).

In Rochester there were 35 percent and in Syracuse 40 percent of the homemakers who reported they had "studied about what to eat." Most of them had studied the subject in public school. Only a few reported study under other circumstances such as courses offered by the Red Cross, home bureau, and cooking schools. Regardless of which measure of nutritional knowledge was used, a higher percentage of homemakers who had studied about what to eat had some knowledge of nutrition which was lacking in those who had not studied.

### Performance

In relating the performance of the homemaker in feeding her family to her knowledge of nutrition, we considered: (a) recall by the homemaker of foods served her family in the previous 24 hours and whether or not the meals had been typical; (b) recall of beverages (separately for children and adults) served at each meal; and (c) quantitative information obtained by the homemaker's recall of the amounts of certain key foods used during the previous week.

Family income and age and education of the homemaker were related to performance, and nutritional knowledge was related to performance on a group basis. The practices of home-

**Table 2. Percentages of homemakers with knowledge of correct nutritional substitutes for three basic foods**

Basic food	Rochester	Syracuse
Meat, fish, or poultry	61	63
Milk	35	44
Citrus fruit	28	35

makers with little or no nutritional knowledge were compared with those who had adequate knowledge.

The performance of the homemaker in feeding her family was considerably better than her knowledge (table 1). Homemakers who actually used each food group were more numerous than those who mentioned that it should be included in the meals or those who knew why. However, the food groups that were least well known were also least used. It would seem likely that for those groups where knowledge is necessary to appreciate the need for their inclusion in the family meals, inclusion in the 24-hour period was a matter of chance. Certain food groups, such as meat or meat substitutes, potatoes and other vegetables and fruits, and bread, flour, or cereals, are included in most meals conventionally. Probably butter (or fortified margarine) was used more than the figures indicate. Its use may not have been recalled. The figures presented for food usage in the previous 24 hours are almost identical, with minor variations, to those obtained in urban and rural Virginia and in two rural school districts in New York (2, 5).

Approximately 40 percent of both the Rochester and Syracuse homemakers included all seven food groups in their menus. This figure is lower than the 50 percent reported for urban Virginia (2) but similar to those reported for rural Virginia and rural New York (5).

Milk was the usual beverage served at most meals for children. But in substantially all of the homes, it was not the usual beverage for adults at any meal. Only 13 percent reported it as one of the adult beverage choices at breakfast, 33 to 44 percent at noon, and 31 percent at night.

A quantitative estimate of the adequacy of feeding practices with respect to four food groups is presented in table 3, with the bases used in evaluation of adequacy. In about one-fifth of the homes, less than half the suggested quantitative needs of the family were met for both the milk and citrus fruit groups. Again, practice is shown to be best with regard to usage of the meat and meat substitutes group.

Feeding practices did not vary so much with age and education as did levels of nutritional

**Table 3. Percentages of households using adequate quantities of four given food groups during week**

Food groups and adequacy levels	Rochester	Syracuse
<i>Milk</i>		
Less than 50 percent of need <sup>1</sup> -----	20	19
At least 90 percent of need <sup>1</sup> -----	34	31
<i>Eggs</i>		
One per day per person-----	39	33
Three or more per week per person_	98	98
<i>Meat, fish, or poultry</i>		
Two pounds per week per person over 10 years of age and one pound per week per child under 10 years of age-----	91	88
<i>Citrus fruit, tomato, or juices</i>		
Less than 50 percent of need <sup>2</sup> -----	21	20
At least 90 percent of need <sup>2</sup> -----	51	44

<sup>1</sup> Based on 1 pint per day per adult; 1 quart per day per child.

<sup>2</sup> Based on 1 serving of citrus fruit, or equivalent, per day per person.

knowledge. However, the younger and more educated homemakers adhered to better practices than did others. The level of educational attainment of those under study appeared to be the factor which was most consistently related to adequacy of performance in feeding the family. Income effects, as was true for their relationship with knowledge, were considerably less consistent and of smaller magnitude (6). Homemakers who reportedly had studied about what to eat apparently served better meals, both qualitatively and quantitatively, to their families than those who had not studied. The quality of breakfast patterns also improved with the factors which affected other feeding practices (6).

### Knowledge and Action

Adequacy of dietary practices appeared to be related directly to the level of the homemaker's nutritional knowledge. As knowledge increased, so did the percentage of homemakers who included certain basic food groups in the 24-hour period (table 4), though differences were not large.

Differences were evident in the groups where knowledge might be expected to be causative. Of homemakers who had an adequate knowledge of nutrition, those who used all seven of the basic food groups in their meals were a far greater proportion (48 percent) than of those with no knowledge (31 percent). Also, more homemakers with an adequate knowledge (76 percent) served nutritionally good breakfasts than did those with some or no knowledge (62 and 51 percent, respectively).

Knowledge of nutrition appeared to be re-

lated to performance as measured in more quantitative terms also (table 5). There was a smaller percentage of homemakers with an adequate knowledge of nutrition in the category of those using less than 50 percent of their families' suggested needs for milk and citrus fruit.

#### Food Problems and Help Sources

The details on information obtained concerning the planning, buying, and preparation of

**Table 4. Percentages of homemakers in each category of nutritional knowledge using given food groups in previous 24 hours**

Food group	Rochester			Syracuse		
	Level of knowledge					
	None	Some	Adequate	None	Some	Adequate
Meat, fish, poultry.....	98	99	100	100	97	100
Potato, other vegetables and fruits.....	89	93	97	92	91	96
Milk, cheese, ice cream.....	71	88	95	82	90	89
Bread, flour, cereal.....	99	99	100	99	100	100
Butter, fortified margarine.....	93	93	98	97	99	97
Leafy, green or yellow vegetables.....	62	65	71	61	55	66
Citrus fruit, tomato, cabbage.....	69	74	78	59	75	81

**Table 5. Percentages of homemakers in each category of nutritional knowledge using adequate quantities of three given food groups during week**

Food groups and adequacy levels	Rochester			Syracuse		
	Level of knowledge					
	None	Some	Adequate	None	Some	Adequate
<i>Milk</i>						
Less than 50 percent of need <sup>1</sup> .....	27	15	14	21	21	14
At least 90 percent of need <sup>1</sup> .....	30	41	35	37	27	30
<i>Meat</i>						
Two pounds per week per person over 10 years of age and one pound per week per child under 10 years of age.....	85	90	86	84	87	96
<i>Citrus fruit</i>						
Less than 50 percent of need <sup>2</sup> .....	25	24	8	27	22	15
At least 90 percent of need <sup>2</sup> .....	46	51	71	41	41	52

<sup>1</sup> Based on 1 pint per day per adult; 1 quart per day per child.

<sup>2</sup> Based on 1 serving citrus fruit or equivalent per day per person.

food by homemakers are not reported here. However, it was found that family food shopping is done chiefly by homemakers, usually once a week. Most homemakers do not plan meals much ahead of time. More than 40 per cent do their planning on the day of the planned meal or at the "last moment." About two-thirds of the homemakers said they had a specific amount of money to spend for food each week or month. Ninety-two percent of the homemakers felt their families were getting all the needed foods.

One-third of the homemakers said they encountered some difficulty in planning, buying, or preparing food for their families. Two-thirds of those who said they had problems desired help. Means of obtaining variety and planning to suit all of the family's needs were mentioned most frequently. Budgeting, quick menus, food habits, and special diets also were cited as problems in the order named. Younger, better educated homemakers expressed the need for help with more problems than did others.

The homemaker ranked magazines and newspapers as the primary source for information on what to feed the family. Mothers and relatives were the persons most often mentioned as sources. Of professional persons, the greatest number of homemakers felt the physician had given them the most information. Homemakers used recipes and information on food preparation more extensively than other kinds of material supplied. Next most frequently used was information on meal planning and the components of a balanced diet.

Results of the study have been reported to public health, nutrition, education, and extension groups in Rochester, Syracuse, and elsewhere. These have included regional public health and dietetic associations; nutrition committees; nutrition workshops for health, education, and welfare personnel; and workshops for school lunch personnel, for home economics teachers, and for extension workers.

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